CLAIMS

1. An ultrasonic welding assembly comprising a horn and an anvil, wherein said horn comprises a generally T-shaped flattening surface.

2. The assembly as recited in claim 1, wherein said horn further comprises a rail projecting forward of said flattening surface, said rail being shaped to serve as a dam for flowing thermoplastic material.

3. The assembly as recited in claim 2, wherein said horn further comprises a plurality of vertical energy directors designed to direct ultrasonic energy into a mass of thermoplastic material and deflect flowing thermoplastic material of said mass toward said dam.

4. The assembly as recited in claim 2, wherein said rail further comprises a truncated projection shaped to deflect material flow away from a center of said rail.

5. The assembly as recited in claim 1, wherein said horn further comprises a plurality of projections projecting out of said flattening surface.

6. The assembly as recited in claim 5, wherein each of said plurality of projections comprises first and second surfaces that are neither parallel nor perpendicular to said flattening surface, said first and second surfaces being inclined at different angles.

7. The assembly as recited in claim 6, wherein each of said plurality of projections comprises a third surface having a first junction with said first surface and a second junction with said second surface, wherein said third surface is generally parallel to said flattening surface.

8. The assembly as recited in claim 1, wherein said horn further comprises first and second recesses located on opposite sides of a stem of said T-shaped flattening surface.

9. The assembly as recited in claim 8, wherein said horn further comprises first and second bevels, said first bevel being located between said first recess and a first arm of said T-shaped flattening surface and said second bevel being located between said second recess and a second arm of said T-shaped flattening surface.

10. The assembly as recited in claim 1, further comprising an anvil cover overlying opposing portions of said anvil and comprising a T-shaped cutout, wherein said T-shaped flattening surface of said horn fits in said T-shaped cutout of said anvil cover.

11. The assembly as recited in claim 10, further comprising structure for aligning said anvil cover with said anvil.

12. The assembly as recited in claim 11, wherein said aligning structure comprises a dowel pin, a first hole in said anvil for receiving a first portion of said dowel pin, and a second hole in said anvil cover for receiving a second portion of said dowel pin.

13. The assembly as recited in claim 10, wherein said anvil comprises a slot and said anvil cover comprises first and second slots, said first slot of said anvil cover overlying a first portion of said slot of said anvil and said second slot of said anvil cover overlying a second portion of said slot of said anvil.

14. The assembly as recited in claim 13, wherein each of said first through third slots has a respective end portion formed by converging surfaces.

15. The assembly as recited in claim 13, wherein each of said first through third slots has a respective mid-portion formed in part by a beveled surface.

16. The assembly as recited in claim 1, further comprising a heater installed inside said anvil.

17. The assembly as recited in claim 10, wherein said anvil cover comprises a passageway having first and second openings, wherein said first opening is located on a side of said anvil cover that faces said flattening surface of said horn and said second opening is in communication with a source of pressurized air.

18 An ultrasonic welding assembly comprising a horn and an anvil, wherein said horn comprises a flattening surface and a first plurality of projections projecting out of said flattening surface, each of said first plurality of projections comprising first and second surfaces that are neither parallel nor perpendicular to said flattening surface, said first and second surfaces being inclined at different angles.

19. The assembly as recited in claim 18, wherein each of said first plurality of projections comprises a third surface having a first junction with said first surface and a second junction with said second surface, wherein said third surface is generally parallel to said flattening surface.

20. The assembly as recited in claim 18, wherein said horn further comprises a rail projecting forward of said flattening surface, said rail being shaped to serve as a dam for flowing thermoplastic material, said first surface facing toward said rail and said second surface facing away from said rail, said first surface having an angle of inclination, relative to said flattening surface, that is less than an angle of inclination of said second surface.

21. The assembly as recited in claim 18, further comprising a second plurality of projections projecting, at least in part, out of said flattening surface, each of said second plurality of projections comprising a first surface that is neither parallel nor perpendicular to said flattening surface, and a second surface that is generally perpendicular to said flattening surface.

22. The assembly as recited in claim 21, wherein said projections of said first plurality each have a trapezoidal profile and said projections of said second plurality each have a triangular profile.

23. The assembly as recited in claim 21, wherein said projections of said first plurality are flanked by said projections of said second plurality.

24 An ultrasonic welding assembly comprising a horn having a flattening surface of predetermined shape, an anvil and an anvil cover overlying opposing portions of said anvil, wherein said anvil cover comprises a cutout and said flattening surface of said horn fits in said cutout.

25. The assembly as recited in claim 24, further comprising structure for aligning said anvil cover with said anvil.

26. The assembly as recited in claim 25, wherein said aligning structure comprises a dowel pin, a first hole in said anvil for receiving a first portion of said dowel pin, and a second hole in said anvil cover for receiving a second portion of said dowel pin.

27. The assembly as recited in claim 24, wherein said anvil comprises a slot and said anvil cover comprises first and second slots, said first slot of said anvil cover overlying a first portion of said slot of said anvil and said second slot of said anvil cover overlying a second portion of said slot of said anvil.

28. The assembly as recited in claim 24, further comprising a heater installed inside said anvil.

29. The assembly as recited in claim 24, wherein said anvil comprises a passageway having first and second openings, wherein said first opening is located on a side of said anvil that faces said flattening surface of said horn and said second opening is in communication with a source of pressurized air.

30. An assembly comprising a flexible zipper and a slider mounted to said zipper, wherein said zipper comprises a first zipper part comprising a first interlockable element and a second zipper part comprising a second interlockable element, said first and second interlockable elements

being mutually interlockable, and said zipper further comprises first and second slider end stops located at opposing ends of said first and second zipper parts, wherein each of said end stops comprises flattened zipper material having a plurality of spaced spot-shaped indentations.

31. The assembly as recited in claim 30, wherein said indentations lie in a region generally aligned with a region of interlocking of said first and second interlockable elements.

32. A package comprising a receptacle, a flexible zipper joined to said receptacle and a slider mounted to said zipper, wherein said zipper comprises a first zipper part comprising a first interlockable element and a second zipper part comprising a second interlockable element, said first and second interlockable elements being mutually interlockable, and said zipper further comprises first and second slider end stops located at opposing ends of said first and second zipper parts, wherein each of said end stops comprises flattened zipper material having a plurality of spaced spot-shaped indentations.

33. A method for forming a slider end stop on a flexible zipper, comprising the following steps:

interlocking first and second parts of a zipper;

inserting a slider on said interlocked zipper parts; and

transmitting sufficient ultrasonic wave energy into a T-shaped area of said interlocked zipper parts to cause said interlocked zipper parts to flatten and fuse in said T-shaped area, the rails of said interlocked zipper parts being undeformed on both sides of a stem of said T-shape.

34. The method as recited in claim 33, further comprising the step of directing said ultrasonic wave energy to form a series of spaced indentations in said flattened T-shaped area.

35. The method as recited in claim 33, further comprising the step of pre-heating at least one of said zipper parts prior to said step of transmitting ultrasonic wave energy.

36. The method as recited in claim 33, further comprising the step of directing cooling fluid toward a flange of at least one of said zipper parts during said step of transmitting ultrasonic wave energy.